SLOVENSKI STANDARD

SIST EN 14396:2004

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Pritrjene lestve za vstopne jaške

Fixed ladders for manholes

Ortsfeste Steigleitern für Schächte

Echelles fixes pour raccords

Ta slovenski standard je istoveten z: EN 14396:2004

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93.030

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Fixed ladders for manholes

Echelles fixes pour raccords

Ortsfeste Steigleitern für Schächte

This European Standard was approved by CEN on 28 November 2003.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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Contents

Foreword

This document (EN 14396:2004) has been prepared by Technical Committee CEN/TC 165 “Waste water engineering”, the secretariat of which is held by DIN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by July 2004, and conflicting national standards shall be withdrawn at the latest by October 2005.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

For relationship with EU Directive(s), see informative annex ZA, which is an integral part of this document.

Annexes A to F are normative.

This document includes a Bibliography.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

1 Scope

This standard applies to permanently fixed ladders in manholes. It specifies the performance criteria for the mechanical stability and resistance providing protection against falling.

The ladders specified in this European Standard are suitable for use in sewage, rainwater, surface water and, subject to the requirements of national regulations, potable water environments.

2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text, and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

EN 353-1, *Personal protective equipment against falls from a height - Part 1: Guided type fall arresters including a rigid anchor line*

EN 365, *Personal protective equipment against falls from a height — General requirements for instructions for use and for marking.*

EN 10025, *Hot rolled products of non-alloy structural steels — Technical delivery conditions.*

ENV 10080, *Steel for the reinforcement of concrete — Weldable ribbed reinforcing steel B 500 — Technical delivery conditions for bars, coils and welded fabric.*

EN 10088-1, *Stainless steels — Part 1: List of stainless steels.*

EN 10088-3, *Stainless steels — Part 3: Technical delivery conditions for semi-finished products, bars, rods and sections for general purposes.*

EN 10204, *Metallic products - Types of inspection documents.*

EN 13706, *Reinforced plastic composites — Specification for pultruded profiles (all parts).*

EN ISO 179-1:2000, *Plastics — Determination of Charpy impact properties — Part 1: Non- instrumented impact test (ISO 179-1:2000).*

EN ISO 1461, *Hot dip galvanized coatings on fabricated iron and steel articles — Specifications and test methods (ISO 1461:1999).*

EN ISO 4892-2:1999, *Plastics — Methods of exposure to laboratory light sources — Part 2: Xenon-arc sources (ISO 4892-2:1994).*

EN ISO 14125:1998, *Fibre-reinforced plastic composites — Determination of flexural properties (ISO 14125:1998).*

3 Terms, definitions and symbols

3.1 Terms and definitions

For the purposes of this European Standard, the following terms and definitions apply.

3.1.1
fixed ladder with two stringers
ladder, which is stationary and where the rungs are arranged between and attached to the stringers and the stringers carry the load

3.1.2
fixed ladder with one stringer
ladder, which is stationary and where the rungs are attached to both sides of the stringer and the stringer carries the load

3.1.3
fall arrest system
personal protective equipment against falls from a height comprising a full body harness and a connecting sub-system for fall arrest purposes

3.1.4
rest platform
platform located at or near a fixed ladder that enables the person climbing it to rest. It can comprise one or more units

3.1.5
handhold
hand grips provided at the top of the ladder or at the point of entry to the manhole

3.1.6
connector
mechanical device as insert or fishplate to join sections together

3.1.7
section
modules consisting of single or double stringers and rungs designed to join together to produce full height ladders

3.1.8
stringer
vertical structural element to support rungs

3.1.9
stay
element to support and distance a ladder from the manhole wall

3.1.10
rung
solid or tubular element fixed to the stringer(s) to provide a foot or handhold

3.1.11
tread
top surface of a rung to accommodate a foot or hand

3.2 Symbols

L climbing height of ladder

F design load for calculation of strength for fixing at anchor points

F_1 vertical load at rung

F_2 design load for calculation of the fixed ladder system

F_3 load for strength test of stringers (0,4 kN)

F_3' load for strength test of stringers multiplied by the safety factor

γ safety factor

4 Requirements

4.1 General

Fixed ladders shall conform to the requirements of this clause.

Fixed ladders shall be supplied with manufacturer's instructions for mounting and use. For the installation of the fixed ladders, national regulations shall be observed. Information on instructions for assembly and use shall be given by the manufacturer.

If fall arresters are used, EN 365 and regulations in the place of use shall be taken into account.

4.2 Materials

Materials shall be selected to suit the service conditions at the ladder site.

Materials used for fixed ladders shall be one of the following:

— steel conforming to EN 10025 or ENV 10080 and hot dip galvanised according to EN ISO 1461 with thickness according to Table 1;

Table 1 — Galvanising thickness

Thickness of steel components	Local coating (minimum)		Mean coating (minimum) [a]	
	g/m²	µm	g/m²	µm
≥ 6 mm	505	70	610	85
≥ 3 mm to < 6 mm	395	55	505	70
≥ 1,5 mm to < 3 mm	325	45	395	55
< 1,5 mm	250	35	325	45

[a] If the fitness for purpose is not affected, the thickness is not limited to a maximum value

— Glass reinforced plastics conforming to EN 13706 or equivalent and resistant against UV according to annex A;

— austenitic stainless steel conforming to EN 10088-1 or EN 10088-3, minimum grade X6CrNiTi18-10;

NOTE It is recommended that stainless steel of grade X6CrNiMoTi17-12-2 (material no. 1.4571) according to EN 10088-1 be used in sewage and drinking water systems and particular corrosive environments.

— Aluminium alloys, which have been selected in accordance with the manufacturing process and documented by an inspection document according to EN 10204.

Where materials likely to cause electrochemical corrosion are used together, care shall be taken to prevent corrosion, e.g. by ensuring that they are not in direct contact with each other.

For unprotected aluminium alloys consideration shall be made with the choice of ladder materials when prevention of spark generation resulting in explosions is required.

Manhole ladders, including all stays, shall be resistant to corrosion. Ladder materials and corrosion protection systems shall be selected according to the mechanical and chemical loading, as well as the thermal stresses to which each component will be subjected, taking into consideration expected operating conditions.

4.3 Design requirements

4.3.1 Types

Fixed ladders for manholes shall be one of the following types:

Table 2 — Types of fixed ladders

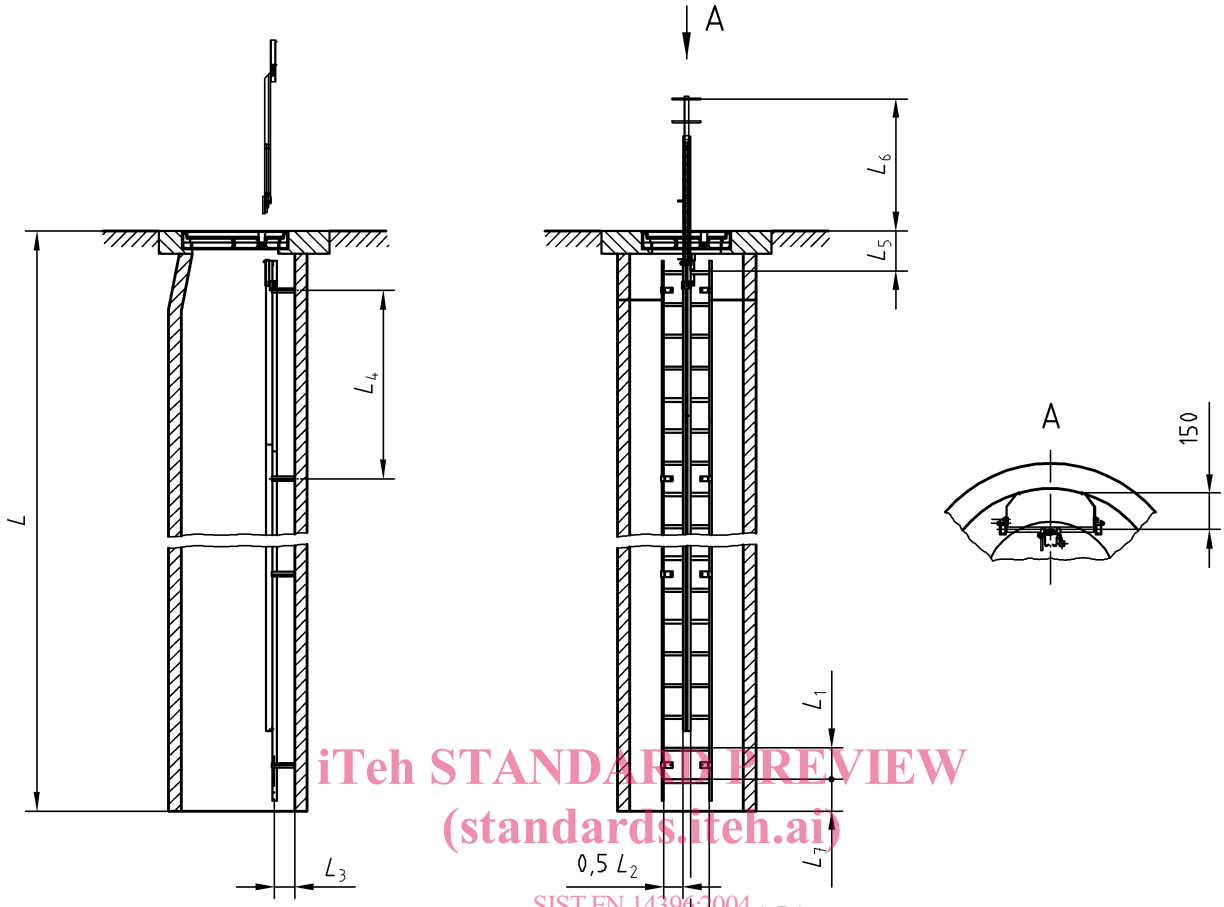
Type	Designation
A	Fixed ladder with movable top extensions
B	Fixed ladder with two stringers and fall arrester
C	Fixed ladder with one stringer and fall arrester
D	Fixed ladder with two stringers
E	Fixed ladder with one stringer

For ladders type A the movable top extension shall be tested according to the provisions in the place of use.

4.3.2 Dimensions

Ladder dimensions are to be taken from Table 3. Examples of ladder design are shown in Figure 1 and Figure 2. The figures are examples only and not intended to fix design. The given dimensions shall, however, be met.

Dimensions in millimetres



Key

L Climbing height

L_1 Distance between the top of adjacent rungs

L_2 Width of rung

L_3 Minimum stand off distance at any point

L_4 Maximum distance between two stays

L_5 Distance from ground level to the top of the first rung

L_6 Height of handhold

L_7 Distance from the bottom rung to the benching

Figure 1 — Ladder with two stringers, fall arrester and handhold

Table 3 — Dimensions for ladders

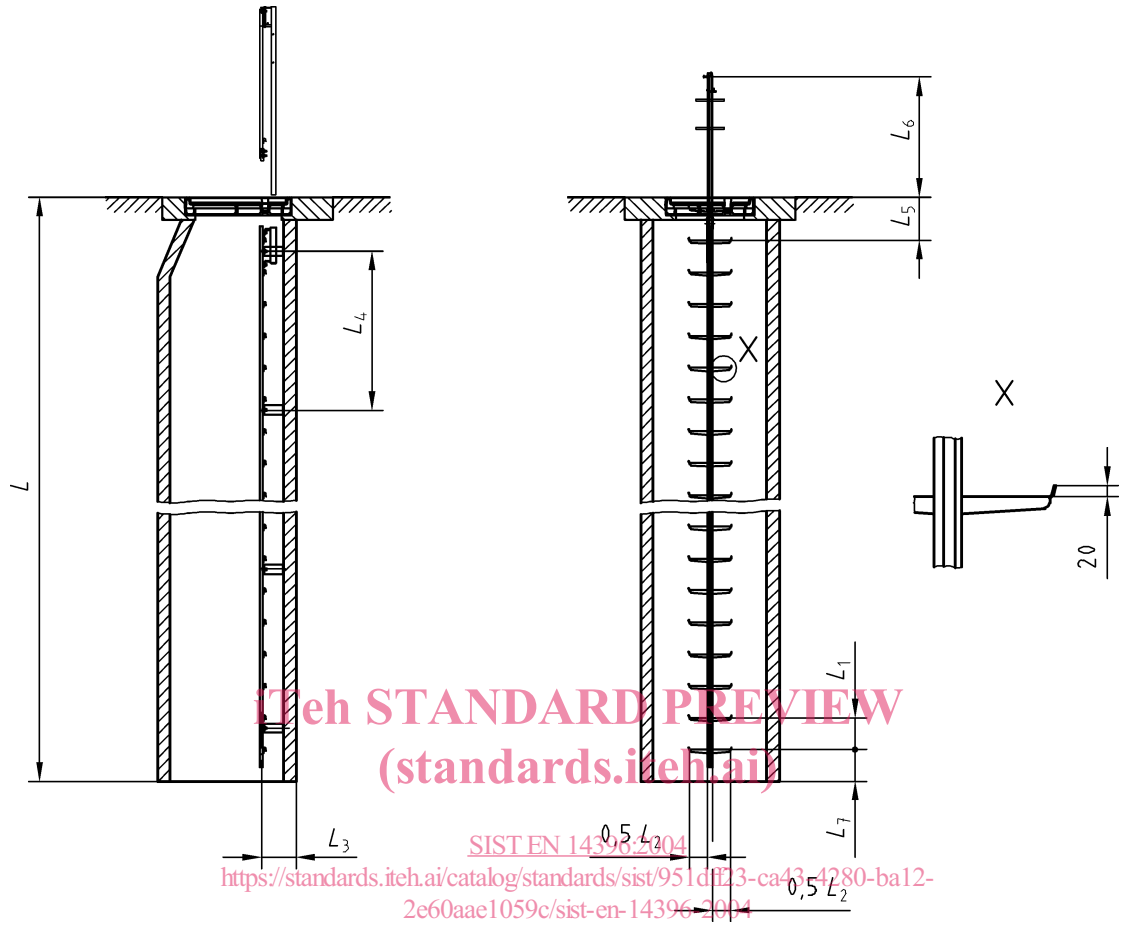
Dimensions in millimetres

Tolerance	L_1	L_2	L_3	L_4	L_5	L_6	L_7
min.	250	300	150	—	—	1000	
max.	300	—	—	[b]	L_1 [a]	—	$\leq L_1$

[a] In special cases (e.g. where the manhole design so requires). For the installation national provisions valid in the place of use shall be taken into account.

[b] To be stated by the manufacturer (see clauses 5 and 6 and ZA.3), but not more than 3000 mm.

Dimensions in millimetres



Key

L Climbing height

L_1 Distance between the top of adjacent rungs

L_2 Width of rung

L_3 Minimum stand off distance at any point

L_4 Distance between two stays

L_5 Distance from ground level to the top of the first rung

L_6 Height of handhold

L_7 Distance from the bottom rung to the bottom of the shaft

Figure 2 — Ladder with one stringer

4.3.3 Surface conditions

Ladders according to this standard shall be free from visible defects, protrusions or sharp edges.

The surface of rungs shall conform to 4.3.6.

4.3.4 Threaded joints

Threaded joints shall be designed so that fasteners cannot work loose.